



Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

00-RU-0110

Mr. M. J. Lawrence, Executive Vice President
General Manager
BNFL Inc.
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Lawrence:

SAFETY INTEGRATION INSPECTION REPORT, IR-99-008

On November 1-4, 1999, the Office of Safety Regulation of the TWRS-P Contractor (Regulatory Unit) completed an inspection of Safety Integration efforts at the BNFL Inc. (BNFL) facility.

The inspection team identified one Finding (documented in the Notice of Finding [Enclosure 1]). This Finding comprised four examples of failure to follow procedures. These examples included failure to follow administrative aspects of the Project Safety Committee procedure; failure to specify review criteria prior to reviewing documents in accordance with procedures; failure to maintain document review and comment forms in accordance with procedures; and failure to control the output of the Hazard Analysis teams in accordance with procedures.

You are requested to provide a written response to the Finding within 30 days, in accordance with the instruction provided in the enclosed Notice of Finding. Details of the inspection, including the Finding, are documented in the enclosed inspection report (Enclosure 2).

The inspection team identified evidence that a viable and effective management and design program was being implemented to ensure safety integration throughout the project. Management, staff, and design programs reflected a good safety culture that was evident in all areas reviewed.

Mr. M. J. Lawrence
00-RU-0110

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Nothing in this letter should be construed as changing the Contract (DE-AC06-96RL13308). If you have any questions regarding this inspection, please contact me or Pat Carier of my staff on (509) 376-3574.

Sincerely,

D. Clark Gibbs, Regulatory Official
Office of Safety Regulation
of the TWRS-P Contractor

REG:JWM

Enclosure: Inspection Report IR-99-008

cc w/encl:
D. W. Edwards, BNFL

NOTICE OF FINDING

Standard 4, "Safety, Health, and Environmental Program," of Contract No. DE-AC06-96RL13308, dated August 24, 1998, between BNFL Inc. (BNFL) and the U.S. Department of Energy (DOE), defines the Contractor's responsibilities under the Contract as they relate to conventional non-radiological worker safety and health; radiological, nuclear, and process safety; and environmental protection.

Standard 4, Section c. 2) (b) of the Contract requires the Contractor to comply with the specific nuclear regulations defined in the effective rules of the 10 CFR 800 series of nuclear requirements.

Title 10 of the Code of Federal Regulations, Part 830, "Nuclear Safety Management," Section 120, "Quality Assurance (QA) Requirements," requires the Contractor to conduct work in accordance with the requirements of the Section 120 and to develop a QA Program that reflects the requirements of Section 120.

The Contractor's QA Program is defined in BNFL-5193-QAP-01, Rev. 4, "Quality Assurance Program and Implementation Plan," dated May 1998.

Section 5.3.2, "Instructions and Procedures," of the Quality Assurance Program and Implementation Plan (QAPIP) requires processes that affect quality to be conducted using approved instructions and procedures.

During performance of an inspection of safety integration conducted November 1-4, 1999, at the Contractor's offices, the Regulatory Unit (RU) identified the following:

- a. Procedure K70P526A_1, "Project Safety Committee," dated July 1999, under the Section titled "Activity," Milestone 1, stated that committee membership list and appointment letters were to be records and submitted to Project Document Control.

Contrary to the above, as of November 4, 1999, appointment letters for six of the PSC members and a list of committee members were not available in Project Document Control.

- b. The "Code of Practice for the Internal Review and Approval of Documents," K13C023_2, dated October 1999, required in Section 3.1, "Document Review Requirements," item 1, that "Review criteria shall be established before performing the review."

Contrary to the above, as of November 3, 1999, review criteria had not been established before performing the reviews on any of the design output documents reviewed by the inspectors.

- c. The "Code of Practice for the Internal Review and Approval of Documents," K13C023_2, dated 10/99, required, in Section 6.0, "Records", that "The Preparer submits comments and comment resolution to PDC for retention."

Contrary to the above, as of November 3, 1999, the comments and comment resolution for drawing numbers DWG-W375PT-PR00014, Rev. 0 (Process Flow Diagram Pre-Treatment Vessel Vent System), and DWG-W375PT-PR00016, Rev. 0 (Process Flow Diagram HLW Feed Receipt and Pre-Treatment) were not in Project Document Control files.

- d. Procedure K70P503A_0, "Hazard Analysis," dated 05/99, in the Section titled "Activity," for Milestones 1-5, the Standards Identification Process Database (SIPD) is considered a "Record" to be submitted to Project Document Control.

Contrary to the above, during the inspection, the inspectors were informed that the SIPD was not being controlled by Project Document Control.

The four examples of failure to follow procedures, as described above, are considered a Finding.

The RU requests that the Contractor provide, within 30 days of the date of the cover letter that transmitted this Notice, a reply to the Finding above. The reply should include: (1) admission or denial of the alleged Finding, (2) the reason for the Finding, if admitted, and if denied, the reason why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further Findings, and (5) the date when full compliance with the applicable commitments in your authorization base will be achieved. Where good cause is shown, consideration will be given to extending the requested response time.

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Office of Safety Regulation of the TWRS-P Contractor

INSPECTION: SAFETY INTEGRATION ASSESSMENT

REPORT No.: IR-99-008

FACILITY: BNFL Inc.

LOCATION: 3000 George Washington Way
Richland, Washington 99352

DATES: November 1-4, 1999

INSPECTORS: J. McCormick-Barger (Lead), Senior Regulatory Technical Advisor
J. Polehn, Senior Regulatory Technical Advisor
J. Boudreau, Regulatory Unit Consultant
D. Kirsch, Regulatory Unit Consultant

APPROVED BY: P. Carrier, Verification and Confirmation Official
Office of Safety Regulation of the TWRS-P Contractor

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EXECUTIVE SUMMARY
Safety Integration Assessment
Inspection Report No. IR-99-008

INTRODUCTION

This inspection of BNFL Inc. (BNFL) safety integration efforts covered the following specific areas:

- Adequacy of the Contractor's actions to manage the integration of safety throughout the organization (Section 1.2)
- Effectiveness of the safety committee program (Section 1.3)
- Adequacy and effectiveness of the safety improvement program (Section 1.4)
- Adequacy of safety integration into the design process (Section 1.5)
- Effectiveness of the program to achieve a safety culture (Section 1.6).

SIGNIFICANT OBSERVATIONS AND CONCLUSIONS

- The Contractor demonstrated an adequate commitment to safety integration during the design phase. This was evident in the project Health and Safety Policy, in the manner in which management and supervisors were communicating expectations, in the way the design program was structured, and in the way management and staff were implementing the design program. (Section 1.2)
- The inspectors found evidence that the Contractor had an effective safety committee program for the design phase of the project. An example of a Finding was identified for failure to follow several administrative requirements in the Project Safety Committee (PSC) procedure. In addition, a self-identified issue was noted concerning the failure to implement an Executive Committee as required by the Integrated Safety Management Plan (ISMP). (Section 1.3)
- The inspectors found that the Contractor was conducting an adequate and effective safety improvement program for the design phase of the project. (Section 1.4)
- The inspectors found evidence that safety integration was being implemented in the design. Results of the Hazards Analysis were being communicated to designers, and hazards control strategies and related performance requirements were accommodated by the design. Both design reviews and integrated safety management (ISM) Cycle 1 meetings included representation from all key organizations responsible for delivery of a plant embodying the principles of safety integration. (Section 1.5)

- The inspectors noted that the Hazard Analysis code of practice requirement for document control of Process Hazards Analysis Records was not being implemented. Neither Hazards Analysis meeting records (and related action items) nor the Standards Identification Process Database (SIPD) were under Project Document Control as required. In addition, while the Code of Practice stated that SIPD was to be used as an action-tracking device, this was not taking place. The procedural issues discussed above were considered an example of a Finding against the Contractor's Quality Assurance Program and Implementation Plan (QAPIP) for failure to follow procedures. (Section 1.5)
- Senior management had established the proper tone for an acceptable safety culture through the establishment of integrated design teams, an extensive set of programs and procedures assuring full safety integration consideration, and frequent Design Manager communication and reinforcement of expectations for vigorous safety integration implementation. Staff reflected an adequate integrated safety culture that was evident in all areas reviewed. (Section 1.6)

SAFETY INTEGRATION ASSESSMENT

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SAFETY INTEGRATION ASSESSMENT INSPECTION REPORT

1.0 REPORT DETAILS

1.1 INTRODUCTION

In accordance with the Tank Waste Remediation System-Privatization (TWRS-P) Contract,¹ Part 1, Section C, Standard 4, Section c. 2) (a), the Contractor was required to develop and implement an integrated standards-based safety management program to ensure that non-radiological worker safety and health, radiological, nuclear, and process safety requirements are defined, implemented, and maintained. As a result, integrated safety management (ISM) is central to the TWRS-P regulatory concept. There are several programs and related documents, which are referenced in the Contractor's Integrated Safety Management Plan (ISMP), including the Safety Requirements Document (SRD), the Quality Assurance Program and Implementation Plan (QAPIP), the Hazard Analysis Report (HAR), and others. The ISMP describes each of these separate programs, and provides an overview of how these programs will be integrated to provide an appropriate safety environment for the TWRS-P Project. The ISMP was approved by the Regulatory Unit (RU), and the Contractor is required to perform work according to the processes specified in the plan and implementing procedures.

The inspectors reviewed the integration aspects of the Contractor's ISM program, safety oversight, and safety culture. Specifically, the inspectors assessed:

- The adequacy of the Contractor's actions to manage the integration of safety throughout the organization
- The adequacy and effectiveness of the safety committee program to address safety issues at all levels of the Contractor's operation
- The adequacy and effectiveness of the Contractor's safety improvement program
- The adequacy of safety integration into the design process
- The effectiveness of the Contractor's program for developing and maintaining a safety culture.

It should be noted that the RU inspection program is multifaceted in its approach to inspecting implementation of the ISMP, specifically, the program includes assessing quality assurance, configuration management, self-assessments and corrective action, design, standards selection process, training and qualification of personnel, authorization basis management, employee

¹ Contract No. DE-AC06-96RL13308 between DOE and BNFL Inc., dated August 24, 1998.

concerns, SRD design standard implementation, and as low as is reasonably achievable (ALARA) for the design program. This inspection focussed on the Contractor's efforts to integrate safety during the design phase of the Contract.

The inspectors reviewed the Contractor's safety integration programs and implementing procedures against the Contractor's authorization basis (e.g., the ISMP, SRD, and the QAPIP). In addition, the inspectors reviewed records, interviewed staff, and observed related activities to determine if the Contractor was adequately establishing, implementing, and maintaining safety integration in accordance with the Contract requirements.

During the inspection of Contractor's activities associated with Integrated Safety, the inspectors reviewed the documents listed in Section 3.4 of this report.

1.2 ADEQUACY OF THE CONTRACTOR'S ACTIONS TO MANAGE THE INTEGRATION OF SAFETY THROUGHOUT THE ORGANIZATION (INSPECTION TECHNICAL PROCEDURE (ITP) I-109)

1.2.1 Inspection Scope

The inspectors assessed the Contractor's overall program for managing safety integration during the design phase of the project. To perform this assessment, the inspectors interviewed project management and line management. In addition, the inspectors reviewed the project's organization chart and design program to determine if the Contractor had put in place the necessary elements to ensure that safety integration was implemented throughout the organization.

1.2.2 Observations and Assessments

During the inspection entrance, the Safety and Operations Manager provided to the inspectors the Contractor's overall view of safety integration. During this presentation, the manager provided a copy of the project's Health and Safety Policy Statement. This document clearly stated that the project viewed health, safety and welfare of workers and public of paramount importance and the top priority of the project. The policy went on to state that all levels of management and supervisory staff were responsible for all safety aspects of the activities or areas under their control. The policy also stated that all employees had the authority to halt work or stop activities that the employees believed to be unsafe or immediately dangerous to life.

During an interview with the General Manager, the General Manager stated that safety integration was a fundamental aspect of the project's design program. From a review of the design program and implementing procedures, as described in Section 1.5.2 of this report, the inspectors found ample evidence to support the General Manager's statement. In addition, from interviews with supervisors and staff, the inspectors found that there was a project wide integrated approach to safety during the design of the vitrification facility. Design managers and supervisors indicated that they had responsibility for integrating safety during design and clearly communicated their expectations regarding this manner to their staff. From interviews with staff and reviews of design review documentation, as detailed in Section 1.5.2 of this report, the

inspectors found ample evidence that safety integration was being implemented throughout the project.

From a review of the Contractor's organization chart, the inspectors concluded that the project was organized in a way that resulted in clear lines of authority and responsibility. In addition, the design program was being implemented in a way that called upon all technical disciplines to provide input to the design several times as it moved from conceptual to final form.

1.2.3 Conclusions

The Contractor demonstrated an adequate commitment to safety integration during the design phase. This was evident in the project Health and Safety Policy, in the manner in which management and supervisors were communicating expectations, in the way the design program was structured, and in the way management and staff were implementing the design program.

1.3 EFFECTIVENESS OF THE SAFETY COMMITTEE PROGRAM (ITP I-109)

1.3.1 Inspection Scope

The inspectors assessed the effectiveness of the Safety Committee Program for the current stage of the project's design process. The inspectors reviewed the Contractor's ISM program, procedures, and records. In addition, the inspectors interviewed selected design staff and management.

1.3.2 Observations and Assessments

The inspectors found that, although the ISMP Section 3.16.1.1 required the formation of an Executive Committee to address corporate safety policies and matters as they relate to the TWRS-P project, the Contractor had not implemented this requirement. The Contractor identified that the Executive Committee did not exist in their self-assessment of October 28, 1999. Resolution of this issue will be tracked as an Inspection Follow-up Item (IR-99-008-01-IFI).

The inspectors found that the Contractor had met the ISMP Section 3.16.1.2 requirement to have a Project Safety Committee (PSC). The charter of the PSC was located in procedure, K70P526A_1, "Project Safety Committee," dated July 1999. The PSC had been formed, was meeting routinely for over a year, and its meetings were being documented in the form of meeting minutes. The inspectors reviewed meeting minutes, and observed the conduct of two PSC meetings. From these activities, the inspectors determined that senior Contractor managers attended PSC meetings. The PSC was addressing facility-specific safety policies and regulations. The PSC was reviewing the results from the safety program via presentation by the Industrial Safety Committee (ISC) Chair. The PSC was reviewing indicators and corrective actions from assessments and inspections as well as audit and assessment reports. However, from the observation of two PSC meetings, the inspectors found actual PSC meeting performance to be mixed. The first meeting was not well structured in that it was difficult to determine what was being asked of the PSC and/or the purpose of the presentations. The second meeting was better. The PSC was observed to review project safety performance, including

reviewing self-assessment and RU inspection issues to identify common problems, such as procedural compliance.

As indicated above, the PSC procedure was reviewed. Weaknesses were found within the procedure and with implementation of the procedure. With regard to the former, the PSC procedure did not have enough detail to ensure consistency of output for the PSC meeting minutes. For example, attendees and approval of documents were not always annotated, and dissenting views, or lack thereof, were not always documented. With regard to the implementation of the PSC procedure, the procedure identified that appointment letters for the PSC members were to be generated and sent to Project Document Control (PDC). However, the appointment letters for six of the PSC members did not appear to exist (i.e., neither PDC, nor staff members, were able to locate these six appointment letters). Also, the PSC procedure identified that a list of names of PSC members were to be sent to PDC. However, PDC had no such list. These procedural weaknesses are an example of the inspection Finding regarding failure to follow procedures as required by the QAPIP Section 5.3.2, "Instructions and Procedures," (IR-99-008-02a-FIN). Despite the observed weaknesses in the procedure and implementation of the procedure, this Finding was not considered a significant weakness in the effectiveness of the Safety Committee Program.

1.3.3 Conclusions

The inspectors found evidence that the Contractor had an effective safety committee program for the design phase of the project. An example of a Finding was identified for failure to follow several administrative requirements in the PSC procedure. In addition, a self-identified issue was noted concerning the failure to implement an Executive Committee as required by the ISMP.

1.4 ADEQUACY AND EFFECTIVENESS OF THE CONTRACTOR'S SAFETY IMPROVEMENT PROGRAM (ITP I-109)

1.4.1 Inspection Scope

The inspectors assessed the adequacy and effectiveness of the Contractor's safety improvement program at the current stage of the project's design process. The inspectors reviewed the Contractor's ISM program, procedures, and records. In addition, the inspectors interviewed selected design staff and management.

Observations and Assessments

As a part of the project's safety improvement program, the inspectors observed that the project did have a safety improvement group that was identified by project personnel as the Industrial Safety Committee (ISC). The ISC was also required by the Washington Administrative Code (WAC-296-24-045). The ISC was reporting its activities and safety statistics to the Project Safety Committee (PSC). The inspectors observed this reporting during two of the PSC meetings.

The inspectors found that the ISC held regular meetings and documented those meetings in the form of minutes. The ISC was observed to have recently documented a charter. The charter was

found to specify that ISC membership contain "representation from employees and management." The inspectors validated this ISC membership mix. The new charter also specified that the ISC Chairperson and Vice-Chairperson were to be elected by the ISC. However, because of the relative newness of the committee as a standing committee, a management appointee was filling the Chairperson position and there was no Vice-Chairperson. This situation was expected to continue until the necessary elections can take place. The Contractor indicated that these elections were expected to take place at the next bi-weekly ISC meeting. Also, the inspectors noted that though the ISC reported its activities to the PSC, neither the charter nor other procedures identify this activity.

The inspectors found that the ISC meeting minutes documented ISC member-identified concerns and corrective actions. For example, problems with air quality, door hazards, and parking lot hazards had been brought up at the ISC meetings and actions had been taken to correct the hazards. In addition, a bulletin board safety information program had been initiated (as required by WAC-296-24-055), a safety bulletin newsletter was being issued monthly to Contractor staff, and some ISC members were performing monthly safety walk-through assessments of the work areas for their work group.

Interviews with inspector-selected ISC members found they strongly perceived a sense of ownership regarding safety (i.e., in both their design work and in their work environment). This was evidenced by their volunteering to be on the ISC committee, their performance of safety walk-throughs of their areas, and their clear understanding of the importance of safety not only in the design work they performed but also in their physical activities in their work areas.

1.4.3 Conclusions

The inspectors found that the Contractor was conducting an adequate and effective safety improvement program for the design phase of the project.

1.5 ADEQUACY OF SAFETY INTEGRATION INTO THE DESIGN PROCESS (ITP I-109)

1.5.1 Inspection Scope

The inspectors assess the degree of implementation of the principles and requirements of safety integration into design documents generated in the execution of the design process, and reviewed the manner in which ISM Cycle 1 hazard analysis results were integrated into the process. To accomplish the stated purpose, the inspectors interviewed design managers and engineers and reviewed design procedures and documentation. In addition, the inspectors reviewed two operation and maintenance philosophy documents supporting two of the reviewed system descriptions, and the Contractor's program for controlling computer software used to perform and document hazard analysis.

Two waste processing systems were also examined during the inspection; High Level Waste (HLW) Feed Receipt – 310 and HLW Feed Pretreatment - 320. Design review efforts by the Technical and Engineering Organization and Process Hazards Analysis Team were evaluated for each system.

Observations and Assessments

1.5.2.1 Design to Prevent and Mitigate Risks

The interviews of design managers and engineers established that they were familiar with the provisions of the program and procedures for executing the design. It was clear to the inspectors that staff involved in the design process was familiar with the principles and requirements for achieving an acceptable level of safety integration into the design process.

Organizationally, the Contractor had implemented an integrated design team approach wherein each design organization was staffed with representatives of all organizations and engineering disciplines that had a vested interest in the final design product. For example, design responsibility was organized by functional areas headed by Area Project Managers who had design staffs accomplishing all aspects of design related to that particular area. Design groups were staffed with all of the necessary engineering disciplines, including representatives of safety, regulatory conformance, operations, and maintenance.

The Contractor had established the program and procedures that assured that an adequate level of safety integration was accomplished during the design process. The inspectors reviewed a sample of the design program procedures and concluded that these provided for a substantial level of safety integration.

Informal design reviews, directed and expected by management, were conducted frequently within discipline groups. Risk prevention and mitigation were addressed in the design reviews from the beginning. For example, the hazards and control strategies (of the Summary of ISM Cycle 1 Results and Identification of Preliminary Design Basis Events, RPT-W375-NS00004, Rev. A, dated October 26, 1999) were reported to be discussed in design review meetings among the lead discipline engineers and passed on to the individual design engineers. Additional design reviews were conducted to bring together all of the various engineering disciplines and organizations which had an interest in the design.

Design engineers pursued information and assistance frequently through daily contact with other discipline counterparts or, in the case of resolution of more complex issues, through the Lead Engineer for coordination with other groups. Operation and maintenance philosophy documents were being established consistent with the state of design development. As the design progresses and matures, it is expected that the operations and maintenance philosophy documents will be defined in greater detail. This approach was intended to assure that the completed design will implement the needs and requirements of all interested parties.

The design review group meetings were documented and action items were identified and tracked to resolution. The final review of design documents included all of the various disciplines and organizations which had a vested interest in the design. Comments identified during the review process were being resolved to the commenter's satisfaction prior to issuing the design document.

Design managers had communicated, and frequently reinforced, their expectations that every discipline and organization with a vested interest in the design had an obligation and requirement

to actively participate in the design process and assure that their needs and requirements were being accomplished by the design at the earliest stage possible.

The inspectors found some problems during the review of the procedures and when comparing the procedure requirements to the execution of the program. First, the "Code of Practice for the Internal Review and Approval of Documents", K13C023A_2, dated 10/99, required in paragraph 3.1 "Document Review Requirements," item 1, that "Review criteria shall be established before performing the review." During the examinations of design document review and comment sheets, the inspectors found that review criteria were not specified. This was an example of a Finding for failure to comply with QAPIP Section 5.3.2, "Instructions and Procedures," regarding the requirement to perform quality related activities in accordance with procedures (IR-99-008-02b-FIN).

Secondly, the "Code of Practice for the Internal Review of Documents," K13C023A_2, dated 10/99, required in paragraph 6.0, "Records," that "The Preparer submits comments and comment resolution to PDC for retention." This requirement was not clearly implemented in Section 2.2.8 of "Code of Practice for Preparation, Checking, and Approval of Drawings and Sketches," K70C551C_0, dated 3/29/1999, which required that "The originating discipline shall transmit copies of the DR&C [Document Review and Comment] forms, including attachments, to the project file [rather than PDC for retention] within 30 days of sign-off of the document." Further, the requirement was not clearly implemented by Milestone 5 of procedure K70P551B_0, "Preparation, Checking, and Approval of Drawings and Sketches," dated 9/30/1999, which stated "Transmit copies of completed DC&A [Document Checking and Approval] and DR&C forms, including attachments, to the project file within 30 days of sign-off of the document." The use of the term "project files" resulted in some level of confusion, as described below, in implementing the requirement that DR&C forms be transmitted to PDC for retention.

The inspectors were unable to locate the DR&C forms in document control for two of the three drawings selected for examination. Project Document Control (PDC) had the DR&C documentation for one of the drawings (number DWG-W375PT-PR00017, Rev. 0). Representatives from PDC stated that drawing review and comment documentation was retained in the responsible engineer's files and the responsible engineer stated that the responsibility for DR&C document retention remained with PDC and that they had forwarded such documentation to the PDC for retention. Ultimately, the DR&C documentation for one of the three drawings was located in the responsible engineer's files; however, the DR&C documentation for drawing DWG-W375PT-PR00016, Rev. 0, was never located. The Administrative Assistant for the responsible engineering group located an e-mail from her predecessor, dated May 12, 1999, to engineers in the group, stating that DR&C documents for several drawings needed to be provided for eventual forwarding to PDC. Drawing DWG-W375PT-PR00016 was identified on the e-mail list. However, nothing was generated to document the problem so that the resolution would be tracked and assured, such as a Deficiency Report. Accordingly, the inspectors concluded that the DR&C documentation for several drawings was not in the PDC files as required by procedure. This is an additional example of a Finding for failure to comply with QAPIP Section 5.3.2, "Instructions and Procedures," regarding the requirement to perform quality related activities in accordance with procedures (IR-99-008-02c-FIN).

The inspectors examined several design documents, identified in detail in other areas of this report, and examined documentation of peer and interdisciplinary review and comment

resolution. The inspectors found that the examined design documents conformed to established engineering standards and, although the design was in the early phase of definition, the degree of detail was consistent with the level of design maturity. The inspectors examined the review and comment documentation by other disciplines and organizations with vested design interest. It was clear that the breadth of review and comment on the designs reviewed demonstrated that a high level of safety integration was being accomplished on the project. Further, comments were resolved to the satisfaction of the reviewer making the comment before the document was issued. In addition, it was clear that the individuals that conducted the reviews and that checked the design were different than the individuals that performed the design.

1.5.2.2 Technical and Engineering Organization Design Review

The Inspectors interviewed the Process Functional Manager in the Technical and Engineering Organization responsible for the Single Discipline Design Review of the two systems identified in Section 1.5.1 above. Meeting minutes were reviewed that identified meeting participants and the actions generated during the meeting.

Design Review meeting participants and their respective areas of responsibility were:

- 2 Process Engineers
- Associate Process Engineer
- Control System (CS) Engineer Pretreatment (PT)
- Development Manager (Ultrafiltration)
- Process Functional Manager
- Process Lead (PT)
- Process Lead Engineer (Balance of Facility (BOF)/PT)
- Safety Engineer (PT)
- Senior Engineer (Ultrafiltration and Leaching)
- Senior Process Engineer (Ultrafiltration)

The list of participants included staff with both operations and safety skills.

An action table, included in the minutes, provided an action item numerical designator, the individual responsible for the action, the due date for closing the action, and a narrative describing the action itself. The meeting record contained a document control number located on the cover page (CCN# 005569, dated August 17, 1999). The inspectors also reviewed a memorandum describing the status of the design review action list. This memorandum also contained a document control number on the cover page (CCN# 006145, dated 9/22/99).

The inspectors determined that the requirements identified in the ISMP for conducting design reviews by the Technical and Engineering Organization were being met.

1.5.2.3 Process Hazard Analysis (PHA) Review

The inspectors determined that the PHA team also reviewed Pretreatment systems PT 310 and PT 320. The team composition, shown below, indicated that process, operations, safety, instrumentation, and mechanical specialists were represented in the task. The inspectors also examined the Hazards and Operability Analyses (HAZOP) study minutes for the two systems

identified. The minutes referenced the system in question, the pertinent Project Flow Diagram (PFD) drawing number, and for each numbered action listed, the keyword, concern, consequences, comments, and action to be taken, along with the name of the individual responsible for responding to the action.

PT 310 – (HLW Feed Receipt)	Safety (Chairman) Operations PT Process PT Mechanical PT Instrumentation Safety (wild card) Safety (secretary)
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PT 320 – (HLW Feed Pre-Treatment)	Safety (Chairman) Operations PT Mechanical Safety (wild card)
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Section 5.5 of the ISMP states that: "The PHA is performed in accordance with the requirements of the TWRS-P Project QAP. This includes establishment of personnel training and qualification requirements, confirming that personnel meet these requirements, application of management reviews, and documentation of results." The Contractor's compliance with the PHA Quality Assurance Program (QAP) requirements is addressed below.

The inspectors examined training records and determined that one of the ten individuals supporting the PHA teams had not been trained in the PHA methodology. Although not specifically required by the training program or facility procedures, the Contractor stated that the individual would receive PHA methodology training to support future PHA efforts.

Actions that arose from the PHA team meetings (HAZOP Cycle 1) were being captured in the HAZOP Software used during the meetings. The Safety Implementation Manager and PHA Chairman stated that there were HAZOP action/response reports generated for each PHA meeting (the definition of actions was included in HAZOP study minutes). The Contractor further stated that the PHA Chairman would be electronically (via the HAZOP Software) sending the reports to the appropriate design engineers for response, and that once responses were sent back to the PHA Chairman, the responses would be entered into the HAZOP Software and tracked by that means. Finally, they stated that the PHA team meeting would then be reconvened to determine whether the responses were adequate and, if so, the action would be shown as closed within the software.

Such action tracking had not yet been fully initiated for the ISM Cycle 1 results, so it was not possible for inspectors to verify whether actions were being closed. (The term "process hazards analysis" is synonymous to "ISM Cycle 1 analysis" in the vernacular adopted by the Contractor.)

The Contractor stated that selected individuals were trained in the use of the HAZOP Software, and only certain of these individuals were authorized to change data in the HAZOP records. The Contractor further stated that HAZOP Software and associated data were not under document

control, but that any significant Design Change Application (DCA) memoranda were being sent to Project Document Control.

The inspectors were told that, in addition to the HAZOP Software and data, Standards Identification Process Database (SIPD) software and data were also not maintained under document control. The Contractor stated that it was the intention of the project to transmit Safety Implementation Notes (SINs) that were referenced in the SIPD to Project Document Control. The SINs are to contain the Action/Response records important to the design engineers.

While the Contractor stated that SIPD did not serve as an action-tracking tool, the inspectors noted that K70C503A_0, "Code of Practice for Hazard Analysis Process," dated May 1999, Section 4.0, "Records," stated that SIPD was required to record actions to be tracked, (i.e., "In addition, the teams' findings and recommendations, actions-to-be-taken, a written schedule of when the actions are to be completed, and documentation of the incorporation of the actions into the design process shall be recorded in the database [SIPD].")

In addition, procedure K70P503A_0, "Hazard Analysis," dated May 1999, in the Section title "Activity" the SIPD is stated to be a "Record" that is submitted to Project Document Control. The Contractor informed the inspectors that the SIPD was not being controlled by Project Document Control. The failure to control the output of the Hazard Analysis teams in accordance with approved procedures is considered to be an example of a Finding for failure to follow procedures as required in QAPIP Section 5.3.2, "Instructions and Procedures" (IR-99-008-02d-FIN).

1.5.3 Conclusions

The inspectors concluded that the Contractor was exercising an adequate level of safety integration in the design process. Specifically, personnel involved in the design process were familiar with the program and procedures governing the process and these procedures assured that an adequate level of safety integration was accomplished during the design process. The multi-discipline team approach to design assured that parties with an interest in the design were involved in the design process at an early stage and comments were being resolved prior to final issue of design documents. The design program adequately integrated the results of process hazards analyses into the design and the Technical and Engineering Organization was performing single and multiple discipline, and independent design reviews.

The inspectors identified two examples where Contractor personnel were not following procedures. One of the examples involved not establishing review criteria before design document reviews were accomplished, as required by procedure. The other example involved not having the drawing review and comment documentation in the PDC, as required by procedure.

1.6 EFFECTIVENESS OF PROGRAM TO ACHIEVE A SAFETY CULTURE (ITP I-109)

1.6.1 Inspection Scope

To assess the effectiveness of the Contractor's efforts to instill in staff an adequate safety culture, the inspectors interviewed management and staff, reviewed position descriptions, and evaluated the Contractor's program for achieving safety integration.

1.6.2 Observations and Assessments

Before conducting the onsite inspection, the inspectors reviewed the Contractor's plans and procedures for integrating safety into the design of the vitrification facility. The inspectors determined that these plans and procedures adequately prescribed methods for ensuring that the design incorporated input from relevant groups and individuals, and that controls were in place to ensure that feedback regarding input was provided to the groups and individuals, as applicable.

During interviews with senior and mid-level management, the inspectors were informed that safety was considered an important element of each employee's duties and that integrated safety was a fundamental part of their design program. From a review of a sample of position descriptions, the inspectors determined that they contained a "Safety Statement" as part of each employee's "Essential Duties & Responsibilities."

As discussed in Section 1.5.2.1 above, the inspectors determined that design managers and engineers were familiar with the provisions for executing safety integration in design. The Contractor's organization supported the implementation of an integrated design approach, and design managers had adequately communicated their expectations that staff actively participate in the design process.

From interviews with staff and review of design review documentation, the inspectors confirmed that staff fully endorsed safety as a responsibility and had actively participated in design activities in an effort to ensure that the design of the facility addressed their safety concerns.

1.6.3 Conclusions

Senior management had established the proper tone for an adequate safety culture through the establishment of integrated design teams, an extensive set of programs and procedures assuring full safety integration consideration, and frequent Design Manager communication and reinforcement of expectations for vigorous safety integration implementation. Staff reflected an adequate integrated safety culture that was evident in all areas reviewed.

2.0 EXIT MEETING SUMMARY

The inspectors presented the inspection results to members of Contractor management at an exit meeting on November 4, 1999. The Contractor acknowledged the observations and conclusions presented.

The inspectors asked the Contractor whether any materials examined during the inspection should be considered proprietary information. No proprietary information was identified.

3.0 REPORT BACKGROUND INFORMATION

3.1 PARTIAL LIST OF PERSONS CONTACTED

S. Amrit, Process Engineer
 P. Baily, HLW Area Project Manager
 G. Blunt, Project Document Control Manager
 K. Boomer, Waste Chemistry
 A. Boos, Area Project Manager-PT and BOF
 A. Dobson, Safety and Operations Manager
 G. Duncan, Design Manager, (LAW)
 G. Duncan, LAW Design Manager
 D. Edwards, Safety and Regulatory Programs Manager
 A. Elsdon, Technical Manager
 M. Fish, Configuration Manager
 J. Fukmoto, Senior Engineering Technician (HLW)
 I. Ghosh, Lead Civil Engineer
 J. Hammond, Safety Implementation Manager
 J. Hebdon, Environmental Safety and Health Manager
 E. Hughes, Engineering Manager
 M. Hyman, Lead Process Engineer
 J. Isherwood, (Jim) Design Manager (Pretreatment)
 J. Isherwood, (John) Design Manager, (HLW)
 M. Johnson, Mechanical Engineer
 D. Klein, Safety and Regulatory Manager
 M. Lawrence, General Manager
 S. Lilley, SIPD Owner
 S. Lynch, Project Management Support
 T. Meagher, Industrial Safety Manager
 D. O'Connor, Safety and Regulatory Programs
 M. Page, Process Functional Manager
 I. Papp, Lead Engineer-PT Process Engineering
 M. Platt, Safety Program Lead
 J. Rigg, Low Activity Waste (LAW) Area Project Manager
 E. Slaathaug, Process Engineer
 S. Sontag, Chairman of Pretreatment ISM Cycle 1 PHA meetings
 C. Studholm, PT Operations Lead
 G. Voyles, QA Manager

3.2 LIST OF INSPECTION PROCEDURES USED

Inspection Technical Procedure I-109, "Safety Integration Assessment"

3.3 LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

IR-99-008-01-IFI	Follow-up Item	Self-Identified issue concerning failure to implement the Executive Committee as required by the ISMP.
IR-99-008-02-FIN	Finding	Four examples (a-d) of failure to follow procedures: PSC procedure not followed; review criteria not specified; review and comment records not properly maintained; and failure to control output of HAZOP efforts.

Closed

None

3.4 LIST OF DOCUMENTS REVIEWED DURING THE INSPECTION

Procedures Reviewed

Code of Practice K70C503A_0, "Code of Practice for the Hazard Analysis Process," May 1999

Code of Practice K70C013_0, "Code of Practice for Design Review Meetings," November 1998

Code of Practice K70C505A_0, "Code of Practice for the Accident Analysis Process," May 1999

Code of Practice K70C514A_0, "Code of Practice for Development of Hazard Control Strategies and Identification of Standards," May 1999

Code of Practice K13C023A_2, "Code of Practice for the Internal Review and Approval of Documents," dated October 1999

Code of Practice K70C551C_0, "Code of Practice for Preparation, Checking and Approval of Drawings & Sketches," March 1999

Procedure K70P551B_0, "Preparation, Checking and Approval of Drawings and Sketches," September 1999

Procedure K71P015_0, "Operating and Maintenance Philosophy Document," November 1998

Procedure K72B502_0, "System Description," November 1998

Procedure K70P526A_1, "Project Safety Committee," July 1999

Procedure K13P051_2, "Authority to Stop Work," July 1999

Procedure K70P003_0, "Design Review," November 1998

Procedure K70P035_0, "Value Engineering Study," November 1998

Procedure K70P503A_0, "Hazard Analysis," May 1999

Procedure K70P505A_0, "Accident Analysis," May 1999

Procedure K70P509_0, "Environmental Protection Program," November 1998

Procedure K70P523_0, "Engineering Studies," November 1998

Procedure K70P525_0, "Defense in Depth," November 1998

Procedure K71B008_0, "Development Requirements Document," November 1998

Procedure K72B003_0, "Control Philosophy Document," November 1998

Procedure K72B016_0, "Construction Strategy," February 1999

Procedure K72B504_0, "Criticality Safety Evaluation and Report," November 1998

Procedure K72P023_0, "Waste Management Philosophy Document," November 1998

Procedure K72P504_0, "Production of Preliminary Safety Analysis Report (PSAR)," March 1999

Other Documents Reviewed

BNFL Inc. memorandum, "Surveillance Report SV-W375-99-QA00011; Standard Selection Process," August 1999

BNFL Organization Chart, September 1999

BNFL Self Assessment Records:

SA-W375-00024, Rev. 0, May 1999, "Management Assessment of Procedural Adequacy for Safety Implementation – DWE/99/005;"

SA-W375-99-00152, Rev. 0, July 1999, "Management Assessment of Procedural Adequacy for Safety Implementation – DWE/99/011;"

SA-W375-99-00189, Rev. 0, August 1999, "SIPD, K70DG528, K70C529;"

SA-W375-99-00201 (update to 00152), Rev. 0, August 1999, "Management Assessment of Procedural Adequacy for Safety Implementation – DWE/99/011;"

SA-W375-99-00202, Rev. 0, July 1999, "SIPD Specification"

DB-W375-EG00001, Revision 1, Basis of Design, June 18, 1999

DWG-W375PT-PR00014, Revision 0, Process Flow Diagram Pretreatment Vessel Vent System, May 5, 1999

DWG-W375PT-PR00016, Revision 0, Process Flow Diagram HLW Feed Receipt and Pre-Treatment, May 4, 1999

DWG-W375PT-PR00017, Revision 0, Process Flow Diagram LAW Feed Receipt, August 31, 1999

Industrial Safety Committee (ISC) Meeting Minutes (January 11 – 28, 1999, and June 8 – September 16, 1999). Note: Minutes from February – May 1999 were missing (i.e., not prepared or issued by the ISC).

Industrial Safety Committee Charter, October 1999

Listing of names of personnel involved with the Project Safety Committee and the Industrial Safety Committee and their position descriptions

Memorandum (CCN# 006145) to Ivan Papp from Sanjay Kalara, "Status of Design Review Action List," September 22, 1999.

Pretreatment O&M Philosophy Receipt, Conditioning and Solids Removal for LAW Feed, RPT-W375PT-OP00001, Rev. 0, September 1999

Pretreatment of O&M Philosophy Effluent Collection, RPT-W375PT-OP00005, Rev. 0, September 1999

Project Safety Committee Meeting Minutes (October 1 – September 16, 1999)

RPT-W375PT-OP00004, Revision 0, Pretreatment O&M [Operations and Maintenance] Philosophy-HLW Feed Receipt, November 1, 1999

RPT-W375PT-OP00007 Draft, Pretreatment O&M Philosophy-HLW Feed Pretreatment

SD-W375PT-PR00007, Revision 0, System Description – PT Vessel Vent System (System No. 540), June 22, 1999

SD-W375PT-PR00011, Revision 0, System Description for HLW Feed Receipt-System PT-310, August 27, 1999

SD-W375PT-PR00012, Revision 0, System Description for HLW Feed Pre-Treatment (System PT-320), August 10, 1999

SD-W375PT-PR00016, Revision 0, System Description for LAW Feed Receipt (Integrated Multiple) Vessel System-System PT-110, September 2, 1999

TWRS-P Office Accident Prevention Program, PL-W375-SA00001, Attachment 8, May 1999

4.0 LIST OF ACRONYMS

ALARA	As Low As Is Reasonably Achievable
BNFL	BNFL Inc.
BOF	Balance of Facility
CFR	Code of Federal Regulations
CS	Control System
DCA	Design Change Application
DC&A	Document Checking and Approval
DOE	U.S. Department of Energy
DR&C	Document Review and Comment
HAR	Hazards Analyses Report
HAZOP	Hazards and Operability Analyses
HLW	High Level Waste
ISM	Integrated Safety Management
ISMP	Integrated Safety Management Plan
ITP	Inspection Technical Procedure
LAW	Low Activity Waste
PDC	Project Document Control
PDF	Process Flow Diagram
PSC	Project Safety Committee
PT	Pretreatment
QA	Quality Assurance
QAP	Quality Assurance Program
QAPIP	Quality Assurance Program and Implementation Plan
RU	Regulatory Unit
SINs	Safety Implementation Notes
SIPD	Standards Identification Process Database
SRD	Safety Requirements Document
TWRS-P	Tank Waste Remediation System-Privatization
WTP	Waste Treatment Plant